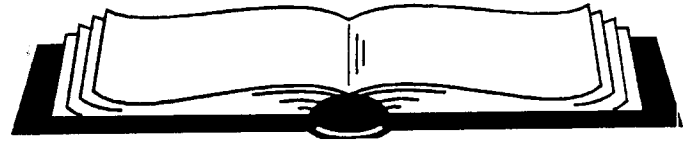


NEW JERSEY

1999-2000

Guidelines and
Application

ORIGINAL

BEST PRACTICES

Deadline for Application to County Office:
NOVEMBER 22, 1999

Category	Social Studies	(Application is limited to one category. See page 3 for details.)
Practice Name	Exploring Across the Curriculum: Problem Solving by Design	
Number of Schools with Practice	1 (If more than one school or district, read and complete information on page 2.)	
County	Monmouth	
District (Proper Name)	Monmouth County Vocational School District	
District Address	41 Highway 34 South	
	street/p. o. box	
	Colts Neck	NJ 07722
	city	zip code
District Telephone	Fax 732/409-6736 E-mail:	
Chief School Administrator	Brian D. McAndrew, Ed.D.	
Nominated School #1 (Proper Name)	Marine Academy of Science & Technology	
School Address		
	street/p. o. box	
	Building 305 Gunnison Road	
	city	Sandy Hook NJ 07732 zip code
School Telephone	Fax 732/291-9367 E-mail: PJC@mast.mcvsd.k12.nj.us	
School Principal	Paul J. Christopher, Ed.D.	
Program Developer(s)	Mrs. Wendy Kelly	
Chief School Administrator's or Charter School Lead Person's Signature		

FOR USE BY COUNTY SUPERINTENDENT OF SCHOOLS ONLY

Approved: ☒ Yes ☐ No County Superintendent's Signature Michael Maddalena
gcl

NEW JERSEY STATE DEPARTMENT OF EDUCATION

Code # 577
(for office use only)

**NEW JERSEY
BEST PRACTICES
1999-2000 APPLICATION**

Application Requirements:

RESPONSES to the information and the statements below must be ANONYMOUS. No reference should be made to the names of the district or the school(s). Use the words "the school" or "the schools" in referring to the applicant in responding to the statements.

USE ONLY THE SPACE PROVIDED ON THE APPLICATION FORM on pages 1, 2 (if applicable) and 4 and THE NUMBER OF LINES SPECIFIED FOR RESPONSES to the statements. Do not include any additional materials, as they will not be reviewed in the selection process.

Application must be **keyboarded on 8 1/2" x 11" white paper, portrait format. Ten-point or larger computer font or twelve-pitch or larger typewriter font must be used.** (This sentence is in ten-point.)

KEYBOARDED RESPONSES to the statements below must be **no more than a total of three pages.** Keyboard the statement followed by the response. Format your response to the number of lines specified. The information on page 4 and the keyboarded responses to statements must be printed or copied on one side of the page. The information on pages 1 and 2 (if applicable) must be printed or copied on one side of the page. Staple pages 1 and 2 (if applicable) and 4 and the keyboarded responses together.

The original application must be signed by the district chief school administrator or charter school lead person, indicating his/her approval.

The original and seven copies of the application must be submitted to the county superintendent of schools by **November 22, 1999**, with the **Itemized List of District Applications** form. Keep the seven copies of each application together with the original containing the signature of the district chief school administrator or charter school lead person on the top of each set.

FAILURE TO COMPLY WITH THE PROCEDURES FOR SUBMISSION OF THE APPLICATION MAY RESULT IN THE ELIMINATION OF THE APPLICATION..

The following data is required to assist the panelists in the evaluation of the application:		
Type of School <input type="checkbox"/> Elementary School <input type="checkbox"/> Middle School <input type="checkbox"/> Junior High School <input checked="" type="checkbox"/> High School <input type="checkbox"/> Other: _____	Grade Levels _____ _____ <u>9-12</u> _____	Practice Name <u>Exploring Across the</u> Curriculum: <u>Problem Solving by Design</u> Number of Schools with Practice <u>1</u> Number of Districts with Practice _____

Check the ONE CATEGORY into which the practice best fits.		
<input type="checkbox"/> Arts (Visual and Performing Arts) <input type="checkbox"/> Assessment/Evaluation <input type="checkbox"/> Bilingual Education and Diversity <input type="checkbox"/> Citizenship/Character Education <input type="checkbox"/> Early Childhood Education Programs <input type="checkbox"/> Educational Support/Guidance and Counseling Programs (services contributing to high student achievement.)	<input type="checkbox"/> Educational Technology <input type="checkbox"/> Health and Physical Education <input type="checkbox"/> Language Arts Literacy <input type="checkbox"/> Mathematics <input type="checkbox"/> Professional Development <input type="checkbox"/> Public Engagement (family involvement and partnerships with business, community and/or higher education.)	<input type="checkbox"/> Safe Learning Environment <input type="checkbox"/> School-to-Careers/Workplace Readiness <input type="checkbox"/> Science <input checked="" type="checkbox"/> Social Studies <input type="checkbox"/> Special Education <input type="checkbox"/> World Languages

1. Describe the practice proposed for recognition, and list its objectives. Detail how the practice is innovative, how it promotes high student achievement and how it can be replicated. **(Maximum of 50 lines for response)**
2. Describe the educational needs of students that the practice addresses and how they were identified. List the *Core Curriculum Content including the Cross-Content Workplace Readiness Standards** addressed by the practice and describe how the practice addresses the standard(s). **(Maximum of 50 lines for response)**
3. Document the assessment measures used to determine the extent to which the objectives of the practice have been met. **(Maximum of 60 lines for response)**

*The May 1996 edition of the *Core Curriculum Content Standards* published by the New Jersey State Department of Education was disseminated to all districts and charter schools and is available on line through the department's website at <http://www.state.nj.us/education>

Exploring Across the Curriculum: Problem Solving by Design

Describe the practice proposed for recognition, and list its objectives. Detail how the practice is innovative, how it promotes high student achievement and how it can be replicated.

Exploring Across the Curriculum: Problem Solving by Design is a large project that provides students with an opportunity to integrate History with Technology Education and also involves technical writing, science and foreign language. Students combine a historical unit of study on exploration with the problem solving process as they design a life size boat from cardboard, latex paint, and contact cement for four team members to cross a designated body of water. In groups of four, students select and research a 16th and 17th century explorer and write a report. The report includes information about the explorer's life, boat, accomplishments and contributions to the existing knowledge of geography. Students must also draw a map of the route the explorer took. They must then translate the report into the explorer's native language and design a team glyph to include graphics that represent both the team members and the explorer. Students then assume the role of boat designers. They calculate the minimum boat dimensions, decide what safety factor to build into the design of the boat, design a boat hull with elements of their explorer's boat, and produce a scaled model of boat design. Student teams develop presentations explaining the historical information about the explorer, team glyph, the explorer, the boat calculations, and the boat design prior to construction of the life size prototype. When the students share the design with the teacher panel and audience, they learn that oversights and mistakes can occur. Most students must go back to the "drawing board" and recalculate or redesign. This process in the project demonstrates how everything is related and must be changed or corrected. New designs must be presented to the panel privately for approval before constructing their prototype. Students then assume the role of technician to construct and finish the boat for testing. Once completed, students assume the role of explorer, venture forth to sail across a designated body of water to an island, explore the island, and draw a map of route, record the exploration and findings. Students must document the test results of the journey and write an evaluation to suggest additional improvements to the design.

The objectives of this project are to provide students with an opportunity to:

- Apply the problem solving process and document the process in a portfolio.
- Research a selected explorer from the 16th or 17th century.
- Write a report and translate it into the language of the explorer.
- Apply technical writing skills in selection, test results and evaluation reports.
- Apply design principles.
- Apply algebraic formulas to design.
- Apply scientific principles to design.
- Construct a scaled model of the boat design.
- Produce a graphic presentation board presenting research on explorer and boat design.
- Orally present explorer research and boat design to a technical panel and audience.
- Make necessary changes to original design.
- Construct a life-size prototype of the boat design.
- Test a design boat.
- Evaluate the boat design.

This problem solving activity allows the students to integrate and apply a variety of historical and technological knowledge. The project makes the history of exploration come alive as the students develop an appreciation of the difficulties faced by an adventure into the unknown historic or modern. Cardboard is an easy materials to obtain and process. Small and large successes are accomplished through a wide range of tasks. This project could be changed to be any type of vessel or structure to align with any historical event.

Describe the educational needs of students that the practice addresses and how they were identified. List the Core Curriculum Content and Cross-Content Workplace Readiness Standards addressed by the practice and describe how the practice addresses the standards.

The administration promotes learning through integration and hands-on activities. Students need to become independent thinkers. Industry wants independent workers who can make decisions, and think analytically and critically. Integration provides a balance of the curriculum and puts learning into perspective. Hands-on activities provide students' with the opportunity to apply the problem solving process and ground gained knowledge. This process encourages high order thinking skills. This practice addresses the following Core Curriculum Content and Cross-Content Workplace Readiness Standards:

CCWR Standard 2 All Students Will Use Information, Technology, And Other Tools.

Students study structural systems and design a structure to float and support and contain a specific load. Students select appropriate software applications to produce work via word processing, creating charts, graphs and spreadsheets for various parts of the proposal/portfolio. Students use appropriate software applications to retrieve information to support their ideas. Students access the Internet and search for related information. Students access and assess information via computer. Students use the computer and/or drawing and measuring tools to produce maps, charts and drawings of boat design. Students also used a variety of technological hand tools to construct the prototype. Students use the computer to produce their portfolio with text, graphics, charts, and drawings and print it for submission. Students use a variety of graphic presentation techniques for the team presentation.

CCWR Standard 3 All Students Will use Critical thinking, Decision Making And Problem Solving Skills

Students use the problem solving process learned throughout the course to design their cardboard boat. The problem solving process alone involves decision-making skills at every step. Critical thinking occurs throughout the brainstorming, research, and designing steps and again at the testing, evaluating and redesigning steps.

CCWR Standard 4 All Students Will Demonstrate Self-Management Skills

Students use the rubric provided to evaluate their portfolio and determine when they have completed the assignment. Students must keep track of their personal input toward the project in a personal log/journal. Students have six weeks to complete the project. Student are then asked to describe in writing how helped their problem solving, communication and leadership skills.

CCWR Standard 5 All Students Will Apply Safety Principles

Students use a variety of tools such as utility knives, small saws and caulk guns. They have to be attentive to their surrounding and keep their areas safe. Students must continually watch out for themselves and others as they work and move about the work areas.

CCC Standard 6.4.11 Analyze historical and contemporary circumstances in which institutions function either to maintain continuity or promote change

Students study European exploration in the 16th and 17th centuries, providing them with insight into how the European nations promoted change through financing explorations, which led to the colonization of the Americas.

CCC Standard 6.5.13 Analyze mutual influences among different cultures through time

CCC Standard 6.5.16 Analyze how beliefs and principals are transmitted in a culture

CCC Standard 6.5.13 Analyze Evaluate the mutual influence of technology and culture

Students studying European exploration are encouraged to identify and analyze the cross-cultural effects of exploration on all cultures involved, citing specific examples. This includes the diffusion of newly introduced beliefs within a culture and the immense impact of new technology, which allowed the exploration to take place.

CCC Standard 6.6.11 Apply economic concepts and reasoning when evaluating historical and contemporary developments and issues

Students evaluate the economic reasons spurring exploration, along with the economic consequences.

CCC Standard 6.8.13 Analyze the impact of human migration on physical and human systems

Students analyze the impact of European exploration on the locations and cultures explored and colonized.

Document the assessment measures used to determine the extent to which the objectives of the practice have been met.

Students receive a rubric with the specifications and limitations of the project and must document and produce the project accordingly. Class time is spent organizing the team to complete a variety of tasks, researching information about the explorer, brainstorming a design for a glyph and boat, writing selection/reject reports, testing, evaluation reports and constructing the boat. Students are responsible for documenting their own work in a project portfolio. The portfolio is a work in progress document that allows a student to keep a record of all that has been accomplished and learned throughout the project. The work consists of research, brainstorming, selection of solution, developmental work by means of drawing and calculating, testing reports, and analysis reports. Photographs are also used to document student and team progress throughout the project. The portfolio addresses organizational skills, communication techniques, research ability, and provides an opportunity for each student to demonstrate their knowledge and skills. The student must demonstrate organizational skills via a table of contents. Communications skills are conveyed through writing samples and drawings. Research ability is evident via reports on topics of information pertinent to the project. Knowledge and skill gained or acquired are conveyed through calculations, photographs and an analysis report. The portfolio ensures that each student is participating. The rubric is then used to assess their portfolio documentation.

The rubric provides criteria for the student to know what level of work is expected. The rubric describes what each level of work is worth according to standards set by the teachers. The work submitted by the student is then rated by category and tallied for a grade.

Each student also keeps an individual journal to document input to the project. In the journal, the student records work started and completed each day. The student keeps track of research done and contacts made to obtain products or information. Students also record any extra time spent on the project outside of class time. The journal helps to keep each student on track and take responsibility for work completed. The journal takes on the role of a time sheet and provides insight into student effort and devotion to project. Use of this method permits the individual and team to evaluate their efforts at each step of the process. It also assures that student evaluation is not based solely on the presentation and boat; but the process by which these outcomes are achieved.